

**AMENDMENTS TO THE CLAIMS**

1 - 3. (Cancelled)

4. (New) Hearing aid with an anti feedback system that operates in one of at least two adaptation modes, a fast adaptation mode and a slow adaptation mode, the hearing aid comprising:

a directional processing block that:

receives input signals from two or more microphones,

generates a DIR-signal with directional sensitivity and an OMNI-directional signal, and

provides, as an output signal, an addition of the DIR and OMNI signals, where the addition is performed by a fader that subjects both signals to gain factors before addition, and wherein the gain,  $\alpha_{\text{omni}}$ , applied to the OMNI-signal has a value between 0 and 1, inclusive, and wherein the gain applied to the DIR-signal is  $(1-\alpha_{\text{omni}})$ ,

an acoustic environment detector that determines whether input signals from said microphones are directional or omni-directional,

a trigger that generates an alert signal to the anti feed back system, said alert indicating the adaptation mode for the anti feedback system based on the value of  $\alpha_{\text{omni}}$ , and a controller that controls the trigger and the fader by generating a value for  $\alpha_{\text{omni}}$  based on input from the acoustic environment detector.

5. (New) Hearing aid as claimed in claim 4 wherein the controller increases the value of  $\alpha_{\text{omni}}$  when the acoustic environment detector determines that the input signals are omni-directional and wherein the controller decreases the value of  $\alpha_{\text{omni}}$  when the acoustic environment detector determines that the input signals are directional.

6. (New) Hearing aid of claim 4, wherein the trigger generates an alert signal indicating a fast adaptation mode when  $\alpha_{\text{omni}}$  exceeds a threshold value.

7. (New) Hearing aid of claim 4, wherein the trigger generates an alert signal indicating a fast adaptation mode when  $\alpha_{\text{omni}}$  falls below a threshold value.

8. (New) Hearing aid of Claim 4, wherein the trigger generates an alert signal indicating a fast adaptation mode when  $\alpha_{\text{omni}}$  has a value in the middle of its value range.

9. (New) Hearing aid of claim 4, wherein the trigger generates an alert signal indicating a fast adaptation mode when a rate at which  $\alpha_{\text{omni}}$  is changing exceeds a threshold value.

10. (New) Hearing aid as claimed in claim 4 wherein the acoustic environment detector has a manual override such that it may be set to determine directional or omni-directional input signals regardless of actual microphone input.

11. (New) Hearing aid as claimed in claim 4 wherein the anti feedback system includes an adaptive feedback tracking portion to track the changes of an external feedback path.

12. (New) Hearing aid as claimed in claim 11 wherein the anti feedback system includes an adaptive filter and a parameterized model of the feedback, where the model parameters are the coefficients of the adaptive filter.

13. (New) Hearing aid as claimed in claim 12 wherein the adaptive feedback tracking portion includes a prediction error sub-unit that adjusts model parameters so that energy in a residual signal after cancellation is minimized, and wherein the parameters are updated with a step given by an adaptive algorithm with a predefined step size  $\mu_0$ , wherein  $\mu_0$  determines the adaptation speed of the adaptive filter.

14. (New) Hearing aid as claimed in claim 13 wherein the step size is adjustable.

15. (New) Hearing aid as claimed in claim 13 wherein there is a large and a small value of  $\mu_0$  such that the small value causes slow adaptation of the adaptive filter, and the large value causes fast adaptation of the adaptive filter.

16. (New) Hearing aid as claimed in claim 15 wherein the anti feedback system includes a tone detector that triggers fast adaptation of the adaptive filter when said tone detector detects howl.

17. (New) Hearing aid as claimed in claim 16 wherein fast adaptation triggered by howl detection is maintained for a predefined period after the howl vanishes, said predefined period being based on hysteresis.
18. (New) Hearing aid as claimed in claim 5, wherein fast adaptation triggered by the alert signal is maintained for a predefined period after the alert signal is no longer being generated by the trigger, said predefined period being based on hysteresis
19. (New) Hearing aid as claimed in claim 4 wherein the directional processing block is part of an external feedback path estimated by the anti feedback system.
20. (New) A method for preventing feedback in a hearing aid with an anti feedback system that operates in one of at least two adaptation modes, a fast adaptation mode and a slow adaptation mode, the method aid comprising:
  - receiving input signals from two or more microphones;
  - generating a DIR-signal with directional sensitivity and an OMNI-directional signal;
  - providing, as an output signal, an addition of the DIR and OMNI signals, where the addition includes subjecting both signals to gain factors before adding them, and wherein the gain,  $\alpha_{\text{omni}}$ , applied to the OMNI-signal has a value between 0 and 1, inclusive, and wherein the gain applied to the DIR-signal is  $(1-\alpha_{\text{omni}})$ ;

determining whether input signals from said microphones are directional or omnidirectional;

generating an alert signal to the anti feed back system, said alert indicating the adaptation mode for the anti feedback system based on the value of  $\alpha_{\text{omni}}$ , and

controlling the trigger and the fader by generating a value for  $\alpha_{\text{omni}}$  based on results of said determining, such that the adaptation mode and the output signal are both governed by directional characteristics of the input signals from said microphones.